

I think he felt that the new electrical industry could be unlimited if proper foresight were used. He also saw that at any one instant all the engineers were absorbed by pressing calls, trouble shooting for improvement and economies of established products. There should be an incubator of unborn ideas to be generated by discoveries in the purely scientific core of electricity. Thus aid would be given engineers, through the electrical curiosity of experimenters in any part of the field. He hoped to keep his electric company co-operating even if the demand ceased for some of its current products.

He wanted actual search for new truth about electricity and so introduced to cost of production a new kind of industrial overhead. Discoveries were not merely desirable end points, but were starting points in an infinite field of electrical service. The process could be self-perpetuating. We have all witnessed ends of many profitable undertakings in electricity where the recovery of commercial activity was successfully cultivated in quite new electrical fields. Such activity as production of carbon incandescent lamps, carbon arc lamps, and so forth, peacefully passed away without excessive hurt. Some unforeseen undertakings in electronics could provide the cure.

At no time in history was there such a great mass of the "unforeseen" available to us. This applies to every bud and tip of countless branches in the forests of trees of knowledge. These can never die and they await appreciation.

I have thought of this in connection particularly with modern chemistry and the new electricity, but it applies as well to all our mental activities. We still fail to realize our possibilities.

The experience of organic chemistry was repeated in electrical science. The new field seems infinite again. There is room enough here for a world of scientists. Certainly some of the slack of postwar depression may be taken up through new knowledge.

I have lived to see that bothersome "Edison-effect" of vacuum lamps develop into the boundless areas of electronics. Hard, round, indivisible atoms, of centuries' endurance, began to emit some of their components. Nothing could have been more "unforeseen" than that. And now photographs of some of those organic chemical molecules are actually made without light, by electrons which give us a magnification scores of times higher than was ever optically possible. The wildest imagination never foresaw what has actually come from this truly "unforeseen."

In summarizing advances in practical electronics, I like to compare the electron with Archimedes' lever. Electrons do their work by using imaginary dimensions and almost nothing for the levers. The length, the fulcrum, and the material have disappeared. Disembodied electrical power itself is guided by unhuman electrical senses. Resembling our human senses, they are much more exact and tireless. The power of screws, the use of

wheels, hydraulic rams and presses, pulley blocks, belts and trunnions, and races of ball bearings came directly from the principle of the lever. Certainly one could lift the world if a fulcrum were ready. Perhaps the same should be said of the electron. Employed first for speaking, hearing, seeing, smelling, tasting, and feeling, it can record its findings and it can also present its records at any time in any part of the world. It can use a sub-conscious integrating entity for directing and controlling any amount of power while performing any kind of work at any desired rate.

The strange thing about it is that this is all done, not by "mirrors," but by next to nothing in a vacuum.

Electronics seems to me as extensive and promising a new science as the whole of electricity seemed but a few years ago.

Gerard Swope—Hoover Medalist

KARL T. COMPTON, Fellow AIEE

GERARD Swope is presented for the Hoover Medal on the ground of his "constructive public service in the field of social, civic, and humanitarian effort." One of his humanitarian efforts has been to help me on many occasions in the consideration of measures for improving the educational work of the Massachusetts Institute of Technology, of which he is an executive committee member.

I attempt to summarize some aspects of the constructive public service for which this medal is awarded with some misgiving as the result of a dinner conversation which I had last night with the head of one of the divisions of the General Electric Company. He told me that the first thing which struck him about Gerard Swope was his impatience at having to waste valuable time listening to statements about matters on which he was already informed.

As the setting for the particular achievements recognized by this award, turn briefly to Gerard Swope's engineering and business career. It was two years before his graduation in 1895 as an electrical engineer from the Massachusetts Institute of Technology that he was first employed by the General Electric Company in the humble rank of "helper." At the Massachusetts Institute of Technology one of his instructors was Doctor Willis R. Whitney. I had a very interesting letter from Doctor Whitney apropos of this occasion, in which he described his very favorable impression of Gerard Swope as a student, and his equally favorable impression of Gerard Swope as his chief later on. As a student he remarks that, as he recalls it, Gerard Swope was not one

Karl T. Compton is president of Massachusetts Institute of Technology, Cambridge.

of the group which attached the compressed air to the gas mains. As a chief, he remarked that looking back on the efforts which he had made and the many discussions he had had with Mr. Swope in regard to the increasing of the research facilities of the General Electric Company, he was inclined to feel that any lack of securing even more support than he did secure was due to his lack of imagination and failure to present the case rather than to any withholding of support by his chief.

After graduation from the Massachusetts Institute of Technology, he went to work in the shops of the Western Electric Company and shortly thereafter became manager of the branch in his boyhood home city of St. Louis, Mo. Then after two years in the Chicago (Ill.) Division, he came to New York as general sales manager of the company in 1908, and five years later he became vice-president and director.

In 1919 he left the Western Electric Company to become president of the International General Electric Company. A sentimentalist might say that this was going back to his first love and suggest that it was the consummation of day dreams which may have passed through his mind during his career as helper 26 years earlier with the General Electric Company, but I have heard a much more realistic explanation from one of his former colleagues in the Western Electric Company to the effect that Swope so outgeneraled his General Electric competitors year after year that, unable to beat him, they had to elect him their own president.

However this may be, he became General Electric Company's president in 1923, resigning from this position in 1940, but he was called back to it in September 1942 in order that his successor, Charles E. Wilson, might accept the vice-chairmanship of the War Production Board.

His career as electrical engineer, commercial engineer, and industrialist has brought him distinction and a good living. But in so far as the Hoover Medal is concerned, this industrial career has given setting and opportunity for what we in academic circles call extracurricular activities—activities which go beyond the minimum requirements of the job, though usually constructively related to it. Therefore, I am going to suggest some of the present medalist's interests which are typical of those for which the Hoover medal is awarded.

In the field of economic leadership little need be said. Though of very great significance, Gerard Swope's accomplishment in this field is obvious. The administration of a great industrial organization in such manner as to give the public more and better services and products at less cost, to build up the loyalty and

Hoover Medalists

- 1930 **Herbert Hoover**
- 1936 **Ambrose Swasey**
- 1938 **John F. Stevens**
- 1939 **Gano Dunn**
- 1941 **D. Robert Yarnall**
- 1942 **Gerard Swope**

self-respect of the members of the organization, to satisfy the stockholders, to inaugurate policies designed to stabilize the business through good times and bad, yet flexible enough to meet new situations successfully; to be ever on the alert to seize opportunities for technological or social improvement—such administration in itself is economic leadership of high order. Such leadership Gerard Swope has

displayed throughout his career.

I think the basic reason for his success in this field is disclosed in a comment by the one who knows him best, his wife. She remarked that, "He has always thoroughly respected his job, . . . believing that industry, which touches so many lives, is a most important part of our society."

I can do no better in introducing the next comments than again to quote Mrs. Swope, at the same time mentioning that she has shared his intense interest in humanitarian affairs ever since they first met in connection with the activities of Hull House in Chicago and under the influence of Jane Addams. Mrs. Swope has told me that her husband "has always been more interested in civic and social projects and aims than in the purely philanthropic which, rightly or wrongly, seem to him less constructive."

I have, myself, observed his keen combination of hard-headed practical good sense and altruistic purpose. For example, he has long had a strong desire to help deserving young people to secure an education. But he does not approach this by the easy way of giving them money, except perhaps as an occasional incentive in the form of a prize. He has also been concerned with the financing of educational institutions in which he has been interested, but again his normal approach is not in the easy and limited manner of a gift. Instead, for example, he combined all these objectives in a constructive manner by raising a large loan fund, available to deserving students and administered in businesslike fashion so as to be perpetually revolving. This aids the student, justifies the institution in charging a substantial tuition, and hence aids the institution, and yet is devoid of the element of charity. Except for the original donors of the fund, it is a strictly business proposition on all sides, payment for value received but under most helpful circumstances.

On a much more important scale, these same principles were embodied in Gerard Swope's very important contributions toward the solution of problems of unemployment and stabilization of industry. On these problems he worked with great zeal and effectiveness, especially during the early 1930's when the public was generally bewildered by the tragedy of the depression. Characteristically thinking ahead of the majority of his

fellows, he was ready with constructively thought out proposals, and by his leadership and stimulation, did an enormous service in helping to mold the thinking of businessmen, labor leaders, and the general public.

This industrial relations situation is complicated by forces of prejudice, politics and selfishness, as well as of scientific logic. It is not strange, therefore, that the Swope plan of unemployment insurance or the Swope plan of industrial stabilization have not been adopted just in the form in which he proposed them. Yet it is certainly fair to say that the plans now in force under such auspices as, for example, the Social Security Act, are far better plans than we would have had except for the ideas and stimulus contributed by Gerard Swope. Also, all through the ranks of industry, labor, and government are officials whose sympathetic understanding of problems of employer-employee relations and industrial stabilization is based directly or indirectly on the organized thinking of which his contributions were so significant a part.

But to get back to Swope's basic attitude in these matters, take the case of unemployment benefits. He did not like any system of doles or handouts, either from industry to its workers or from government to its citizens. He believes that such expedients are not only not constructive, but that they are positively demoralizing. But he does believe in giving help generously where the person helped co-operates in the effort, and provided it is done in such manner as will tend to create conditions reducing the necessity for help in the future.

For example, his unemployment-insurance plan adopted by the General Electric Company provided joint contributions to the reserve fund both by company and employees. Thus, to protect the fund and to reduce the size of their contributions to it, both parties have a financial incentive to run their affairs so as to keep unemployment at a minimum. He disapproved a state plan which proposed simply to pool all contributions from employers, on the ground that this would detract from the financial pressure on each individual employer to run his own business as stably as possible, and also on the ground that this would force one employer to pay part of the costs of careless employee management by another.

Thus, throughout Gerard Swope's altruistic idealism, we see a clear pattern of shrewd business judgment and fundamental fairness. This element, combined with his absolute unselfishness and intense desire to improve human society, are, in my judgment, the foundations of his work which have led to the award of the Hoover Medal.

I am conscious of my inability to present here any adequate portrayal of a man of such energetic and varied accomplishments. I have, therefore, tried to give only some scattered glimpses of the man himself. But to suggest how much more remains unsaid, I am going simply to recount a list of some of his public commissions.

Going back to his early days only a few years after his graduation from college, Gerard Swope served on the Playground Commission of St. Louis and was chairman of the Public Bath Commission of St. Louis. Then during World War I, under General Goethals, he was assistant director of purchase, storage, and traffic on the general staff of the United States Army, for which he was awarded the Distinguished Service Medal. Then coming into the times of the early depression, his public services included the following:

Industrial Advisory Board of the National Recovery Administration.

Chairman of the Business Advisory and Planning Council, under Secretary Daniel Roper.

Chairman of Coal Arbitration Board.

President's Advisory Board on Economic Security.

First National Labor Board.

First president of the National Electrical Manufacturers Association.

Advisory Council on Social Security.

Chairman of the Industrial Relations Commission to Great Britain and Sweden.

Chairman, Eighth American Red Cross Roll.

Chairman of the National Mobilization for Human Needs.

Member of the Corporation and Executive Committee of Massachusetts Institute of Technology.

Member of visiting committee of Department of Astronomy of Harvard University.

Past president and director of Greenwich House, New York, N. Y.

Council on Foreign Relations.

President, Westchester County Park Commission.

Taconic State Park Commission.

Chairman, New York City Housing Authority.

Assistant to the Secretary of the Treasury.

Chairman, National Budget Committee for War Appeals.

Excerpts from letters received following the announcement that Gerard Swope was to receive the Hoover Medal further bear out the fact that his choice as recipient was highly merited. The first from Daniel Roper follows:

"I am glad to learn that you are to make the presentation address on the occasion of the award of the Hoover Medal for 1942 to our mutual friend, Gerard Swope.

"Nothing is more interesting and suggestive than the development in man of ethical qualities which prompt leadership for good. Such qualities are possessed in unusual fullness by Mr. Swope and in doing him honor, we honor ourselves.

"The drastic income tax law of 1917, which I was required to administer, brought the Federal Government and industry into partnership. Concluding that both partners should jointly study their mutual problems, I organized an advisory group of business men to co-operate in interpreting and applying the new and complex law. The plan worked so satisfactorily that when I became Secretary of Commerce in 1933, I began a search for outstanding industrialists to serve as a Business Advisory Council for the Department of Commerce. We were very fortunate in securing Gerard Swope as the first chairman of that Council. Under his guiding

hand, there was organized an able and eminent group of business men who, without compensation and at great personal sacrifice, co-operated with the Department of Commerce, the other executive units of the Government and with the Congress, in studying the problems of the depression period, and, later, the grave problems of the defense program of the Government. Assisted by these advanced studies, several of these men are now prominently identified with the war program and are rendering invaluable service to their Government. I cherish with deep gratitude the very valuable guidance given by Gerard Swope as first chairman of the Business Advisory Council of the Department of Commerce."

The following is a letter received from Fiorello La Guardia, mayor of New York City:

"Mr. Gerard Swope's public spirit and willingness to serve the public was well demonstrated when on the day of his retirement, to which he had looked forward for a long time for a much needed rest, I asked him to step in and take the chairmanship of the New York City Housing Authority. I had a problem on my hands. There were millions of dollars in construction or about to commence. There were thousands of families waiting the completion of these low-cost housing units. In typical Gerard Swope fashion he curtailed a planned trip to South America, worked on the ship, came back in a few weeks and assumed his duties. He did a creditable job, a difficult one, and served up to the time that he was called to Washington. The city is in debt to Gerard Swope for his splendid services and is indeed grateful."

Finally, comes a letter from Gerard Swope's closest associate, Owen D. Young, whom I asked for help. Because his reply is so interesting and because he is such a master of the subject under discussion, I am going to take the liberty of quoting his entire letter:

"Replying to your letter of November 30 about Gerard Swope, I should say first of all that I am primarily interested in the over-all picture of a man and secondarily in his accomplishments. The latter are only items of proof, the detail of the picture.

"Starting with his most obvious characteristic, one recognizable on the instant of a first meeting, is his dynamic personality. He is like a spring under tension always, never spent and never relaxed. The next characteristic is his utter incapacity for ambiguity. He can not think ambiguously, and he could not speak ambiguously if he would. As a result of these two qualities, you have force and clearness which are as vital to an effective person as they are to effective speech. Together they are an instrument of penetration like the scalpel or the X-ray, a tool which nature gave him and which has improved progressively with use. It is a dangerous tool which has ruined many men. It is safe only when coupled to industry and anchored to character.

"Gerard Swope is passionately industrious and inescapably devoted to principle. His industry urges him to know more about any subject he touches than others, at least more of the vitals of it. His principle is always an insurance against industry leading him astray.

"What I have said above is true whether he touches engineering or accounting or finance or salesmanship or negotiation in any form. It was true of him as an officer of the Western Electric Company. It was true of his service in the last war under General Goethals and his conspicuous capacity to adapt himself as a civilian to a military regime. It was true of him as president of the International General Electric Company which stretched his geography and his experience with other peoples and other races. He was successful alike with the English, French, Germans, Japanese, and Chinese, to mention only the conspicuous samples. I dare say that it has been true of him as a trustee of your own Institute [Massachusetts Institute of Technology].

"These are the reasons why Gerard has been such a great success as president of the General Electric Company: the determination to understand its sprawling activities, the capacity to relate engineering, manufacture and sales into a single integrated picture, yet with full comprehension of the variables in each of the individual pieces. This means great capacity to deal with things. It would all be useless, however, unless it were intimately geared to a knowledge and understanding of people.

"That is the reason why Gerard did run a great concern without a strike. That is the reason why he was General Electric's most successful salesman. That is the reason why programs of retirement, pensions, savings, unemployment protection, and similar contributions to the welfare of his associates in the General Electric Company, which included every employee, were adopted and made practically effective to the utmost extent that competitive conditions and corporate solvency would permit.

"The problem of making a great concern function for the maximum benefit of employees, stockholders, and the public requires not only the conscience of a trustee, but that clarity of mind and fairness and firmness of decision which prevents any one of the three encroaching on the others. They are all superficially in conflict and all basically unified in ultimate interest. One must have keen human sympathy to do such a job. He must keep his emotions controlled by his intelligence and keep all of them in hand by devotion to principle. That means intelligence, human sympathy, and character functioning at their best.

"Such are the qualities which, to my mind, have made Gerard Swope worthy of the Hoover Medal."

Honored already by medals and decorations at home and abroad and by numerous honorary degrees—such is the man, and the record of the man, to whom the Hoover Medal has been awarded.

The Engineer and Social Development

GERARD SWOPE, Fellow AIEE

THE citation given me is much more generous than my efforts warrant—it is really the reflection of the ideal of the work of engineers for the public good. It is recognized that engineers are dealing not only with material and natural forces but with and for human beings.

This ideal of the engineering societies points the way to a wider opportunity for the engineers to take a greater part in the progress of social development. The foundation of such participation should be a broader and more comprehensive conception of the education of the engineer. Today, we have abandoned the old fatalistic idea that engineers are born and not made, and we now believe that much can be done by training and environment in broadening the scope of the engineer's activities.

The foundation of engineering training is, of course, in the exact sciences, mathematics, physics, and chemistry. The education of the engineer, however, must not be confined to these basic subjects but should include